AMENDMENT TO THE CLAIMS

1.(Previously Presented) A method of writing and erasing optical data comprising:

providing a photorefractive polymeric material having a single isomeric state with a refractive index;

focusing light on the photorefractive polymeric material to cause two-photon excitation of the material at the focal point to produce a refractive index inhomogeneity resulting from a non-uniform space-charge distribution within the region of excitation within the photorefractive polymeric material, thereby modulating the refractive index of the material at the focal point to record data; and

illuminating the material with radiation to erase the recorded data.

2.(Previously Presented) A method of writing and re-writing optical data in a photorefractive polymeric material having a single isomeric state and a refractive index comprising:

focusing light on the photorefractive polymeric material to cause two-photon excitation of the material at the focal point of the beam to produce a refractive index inhomogeneity resulting from a non-uniform space-charge distribution within the region of excitation within the photorefractive polymeric material, thereby modulating the refractive index at the focal point to write data;

illuminating the material with radiation to erase the recorded data;

focusing light on the photorefractive polymeric material to cause two-photon excitation of the material at the focal point to produce a refractive index inhomogeneity

resulting from a non-uniform space-charge distribution within the region of excitation within the photorefractive polymeric material, thereby modulating the refractive index at the focal point to re-write data in the photorefractive polymeric material.

3.(Canceled)

4.(Previously Presented) A method according to claim 1 wherein the photorefractive material is illuminated with electro-magnetic radiation having a wavelength in the ultraviolet (UV) or visible spectrum to produce a redistribution of the spatial distribution of the electric charges forming bits of the data to erase the recorded data.

5.(Original) A method according to claim 4 wherein the photorefractive polymeric material is such that it absorbs radiation in only a narrow band in the UV to visible region of the electromagnetic spectrum.

6.(Previously Presented) A method according to claim 4 wherein the maximum of the absorption band of the photorefractive polymeric material falls substantially within the range from about 380 nm to about 600 nm.

7.(Previously Presented) A method according to claim 4 wherein the photorefractive polymeric material is such that is absorbs substantially no radiation above a wavelength of about 630 nm.

8.(Previously Presented) A method according to claim 1 wherein the data recorded in the photorefractive polymeric material is read by illuminating the photorefractive polymeric material with coherent light of a wavelength falling substantially within the range from about 630 nm to about 1200 nm.

9.(Previously Presented) A method according to claim 1 wherein the light used to record data in the photorefractive material has a wavelength falling substantially within the range from about 750 nm to about 1200 nm to cause two-photon excitation.

10.(Previously Presented) A method according to claim 1 wherein a pulsed laser beam is used to record data in the photorefractive polymeric material.

11.(Previously Presented) A method according to claim 1 wherein a continuous wave laser beam is used to record data in the photorefractive polymeric material.

12.(Previously Presented) A method according to claim 1 wherein polarized coherent light is used to record polarized bits of data in the photorefractive polymeric material.

13.(Previously Presented) A method according to claim 12 wherein different polarization states of the recording beam are used to record multiple bits of data at the same position having different polarization states in the photorefractive polymeric material.

14.(Previously Presented) A method according to claim 12 wherein bits of recorded data are read by using a reading beam having an appropriate polarization state.

15.(Previously Presented) A method according to claim 12 wherein individual bits of data are erasable by changing the polarization state of the individual bits.

16.(Previously Presented) A method according to claim 1 wherein the photorefractive polymeric material includes at least about 25% of a polymer by percentage weight of the total weight of the photorefractive material.

17.(Previously Presented) A method according to claim 1 wherein the photorefractive polymeric material includes a chromophore which provides absorption in the UV to visible region of the electromagnetic spectrum.

18.(Previously Presented) A method according to claim 1 wherein the photorefractive polymeric material includes a photosensitive material which provides absorption in the UV to visible region of the electromagnetic spectrum.

19.(Previously Presented) A method according to claim 1 wherein the photorefractive polymeric material includes a plasticizer to reduce the glass transition temperature of the material.

20.(Previously Presented) A method according to claim 1 wherein the photorefractive material includes at least some of the following materials in quantities falling substantially within the

following ranges by percentage of the total weight of the photorefractive material:

25% - 99.5% of a polymer ;

0.5%-60% of a chromophore;

0.5%-5% of a photosensitive material; and

0% - 40% of a plasticizer.

21.(Previously Presented) A method according to claim 16 wherein the polymer comprises poly (*N*-vinylcarbazole) (PVK).

22.(Previously Presented) A method according to claim 16 wherein the polymer comprises poly (methyl methacrylate) (PMMA).

23.(Previously Presented) A method according to claim 17 wherein the chromophore comprises 2, 5- dimethyl - 4 - (p-nitro-phenylazo) anisole (DMNPAA).

24.(Previously Presented) A method according to claim 18 wherein the photosensitive material comprises 2, 4, 7-trinitro-9-fluorenone (TNF).

25.(Previously Presented) A method according to claim 19 wherein the plasticizer comprises *N*-ethylcarbazole (ECZ).

26-45.(Canceled)

46.(Previously Presented) A method according to claim 20 wherein the polymer comprises poly (N-vinylcarbazole) (PVK).

47.(Previously Presented) A method according to claim 20 wherein the polymer comprises poly (methyl methacrylate) (PMMA).

48.(Previously Presented) A method according to claim 20 wherein the chromophore comprises 2,5-dimethyl-4-(p-nitrophenylazo)anisole (DMNPAA).

49.(Previously Presented) A method according to claim 20 wherein the photosensitive material comprises 2,4,7-trinitro-9fluorenone (TNF).

50.(Previously Presented) A method according to claim 20 wherein the plasticizer comprises N-ethylcarbazole (ECZ).

51.(Previously Presented) A method according to claim 1 wherein the photorefractive polymeric material used in the method includes the following materials:

poly(N-vinylcarbazole) (PVK);

2,5,dimethyl-4-(p-nitrophenylazo) anisole (DMNPAA)

2,4,7-trinitro-9-fluorenone (TNF); and

N-ethylcarbazole (ECZ)

52.(Previously Presented) A method according to claim 51 wherein the PVK;DMNPAA;TNF and ECZ are present in approximately the following concentrations by percentage weight of the total weight of the photorefractive material 33:50:1:16.

53.(Previously Presented) A method according to claim 1 wherein the photorefractive polymeric material used in the method includes the following materials:

poly (methyl methacrylate) (PMMA);

2,5, dimethyl-4-(p-nitrophenylazo) anisole (DMNPAA);

2,4,7-trinitro-9-fluorenone (TNF); and

N-ethylcarbazole (ECZ)

54.(Previously Presented) A photorefractive polymeric material according to claim 53 wherein the PMMA: DMNPAA; TNF and ECZ are present in approximately the following concentrations by percentage weight of the total weight of the photorefractive polymeric material 73:10:1:16.

55.(Previously Presented) A method according to claim 2 wherein the photorefractive material is illuminated with electro-magnetic radiation having a wavelength in the ultraviolet (UV) or visible spectrum to produce a redistribution of the special distribution of the electric charges forming bits of the data to erase the recorded data.

56.(Previously Presented) A method according to claim 55 wherein the photorefractive polymeric material is such that it absorbs radiation in only a narrow band in the UV to visible region of the electromagnetic spectrum.

57.(Previously Presented) A method according to claim 55 wherein the maximum of the absorption band of the photorefractive polymeric material falls substantially within the range from about 380 nm to about 600 nm.

58.(Previously Presented) A method according to claim 55 wherein the photorefractive polymeric material is such that is absorbs substantially no radiation above a wavelength of about 630 nm.

59.(Previously Presented) A method according to claim 2 wherein the data recorded in the photorefractive polymeric material is read by illuminating the photorefractive polymeric material with coherent light of a wavelength falling substantially within the range from about 630 nm to about 1200 nm.

60.(Previously Presented) A method according to claim 2 wherein the light used to record data in the photorefractive material has a wavelength falling substantially within the range from about 750 nm to about 1200 nm to cause two-photon excitation.

61.(Previously Presented) A method according to claim 2 wherein a pulsed laser beam is used to record data in the photorefractive polymeric material.

62.(Previously Presented) A method according to claim 2 wherein a continuous wave laser beam is used to record data in the photorefractive polymeric material.

63.(Previously Presented) A method according to claim 2 wherein polarized coherent light is used to record polarized bits of data in the photorefractive polymeric material.

64.(Previously Presented) A method according to claim 63 wherein different polarization states of the recording beam are used to record multiple bits of data at the same position having different polarization states in the photorefractive polymeric material.

65.(Previously Presented) A method according to claim 64 wherein bits of recorded data are read by using a reading beam having an appropriate polarization state.

66.(Previously Presented) A method according to claim 65 wherein individual bits of data are erasable by changing the polarization state of the individual bits.

67.(Currently Amended) A method of optical data storage comprising:

providing a photorefractive polymeric material having a single isomeric state with a refractive index, the photorefractive polymeric material including the following materials:

poly(N-vinylcarbazole) (PVK);

2,5, dimethyl-4-(p-nitrophenylazo) anisole (DMNPAA);

2,4, 7-trinitro-9-fluorenone (TNF); and

N-ethylcarbazole (ECZ); and

focusing light on the photorefractive polymeric material to cause two-photon excitation of the material at the focal point to produce a refractive index inhomogeneity resulting from a non-uniform space charge distribution within the region of excitation within the photorefractive material, thereby modulating the

refractive index of the material at the focal point to record data~~; and~~

~~illuminating the material with radiation to erase the recorded data~~.

68.(Currently Amended) A method of optical data storage according to claim 67 further including the steps of illuminating the material with radiation to erase the recorded data, and of re-writing data by focusing light on the photorefractive polymeric material after the original recorded data has been erased to cause two-photon excitation of the material at the focal point to produce a refractive index inhomogeneity resulting from a non-uniform space-charge distribution within the region of excitation within the photorefractive polymeric material thereby modulating the refractive index at the focal point to re-write the data.

69.(Currently Amended) A method of optical data storage comprising:

providing a photorefractive polymeric material having a single isomeric state with a refractive index, the photorefractive polymeric material including the following materials:

poly (methyl methacrylate) (PMMA);

2,5, dimethyl-4-(p-nitrophenylazo) anisole (DMNPAA);

2,4. 7-trinitro-9-fluorenone (TNF); and

N-ethylcarbazole (ECZ);

and focusing light on the photorefractive polymeric material to cause two photon excitation of the material at the focal point to produce a refractive index inhomogeneity resulting from a non-uniform space-charge distribution within the region of excitation within the

photorefractive polymeric material, thereby modulating the refractive index of the material at the focal point to record data~~; and~~

~~illuminating the material with radiation to erase the recorded data~~.

70. (Canceled)

71. (New) A method of optical data storage comprising:

providing a photorefractive material having a single isomeric state with a refractive index; and

focusing light on the photorefractive polymeric material to cause two-photon excitation of the material at the focal point to produce a refractive index inhomogeneity resulting from a non-uniform space-charge distribution within the region of excitation within the photorefractive polymeric material, thereby modulating the refractive index of the material at the focal point to record data.